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FLOOD INSURANCE STUDY

ORIGINAL

TOWN OF SIDNEY, NEW YORK
DELAWARE COUNTY

SEPTEMBER 30, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 360210

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
TOWN OF SIDNEY, DELAWARE COUNTY, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Sidney, Delaware County, New York, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by Leonard Jackson Associates for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-83-C-1190. This work was completed in November 1985.

1.3 Coordination

In November 1979, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives from FEMA, the town, and Leonard Jackson Associates (the study contractor) to determine the streams to be studied by detailed methods.

Information concerning the history of flooding in the community was provided by town officials and residents; the U. S. Geological Survey (USGS); and the U. S. Army Corps of Engineers (COE), Baltimore District.

On December 3, 1986, a final CCO meeting was held with representatives from FEMA, the town, and the study contractor to review the results of the study.

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2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Sidney, Delaware County, New York. The area of study is shown on the icinity Map (Figure 1).

The Susquehanna River and Ouleout Creek were studied by detailed methods for their entire lengths within the community. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through November 1990.

Carrs Creek, Wier Creek, and one unnamed tributary were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Sidney.

2.2 Community Description

The Town of Sidney is located in the northwestern portion of Delaware County in southeastern New York State. The town is bordered by the Town of Masonville to the south, the Town of Bainbridge to the west, the Town of Otego and the Town and Village of Unadilla to the north, the Town of Franklin to the east, and the Town of Walton to the southeast. The town occupies an area of approximately 52 square miles. According to the 1980 census, the population of the town was 2,210 (Reference 1).

The Susquehanna River flows through the northern edge of the Town of Sidney and forms the border with Otsego County. The river flows in a southwestern direction through the town for a distance of approximately 13.4 miles with an average slope of 4 feet per mile. The drainage area at the downstream corporate limits is approximately 1,588 square miles.

Ouleout Creek flows through the northern portion of the town to its confluence with the Susquehanna River. The river flows in a northwestern direction through the town for a distance of approximately 6.3 miles with an average slope of 21 feet per mile. The drainage area of the Ouleout basin at its mouth is approximately 110 square miles.

The climate of the town is characterized by moderately warm summers and cold winters. The mean July temperature is approximately 67.5 degrees Fahrenheit (°F), while the mean January temperature is approximately 20.2°F. The mean annual precipitation over the area is approximately 39.0 inches. Precipitation in the form of snowfall and sleet occurs mainly in the months of December through March with an average annual snowfall of approximately 77.1 inches (Reference 2).

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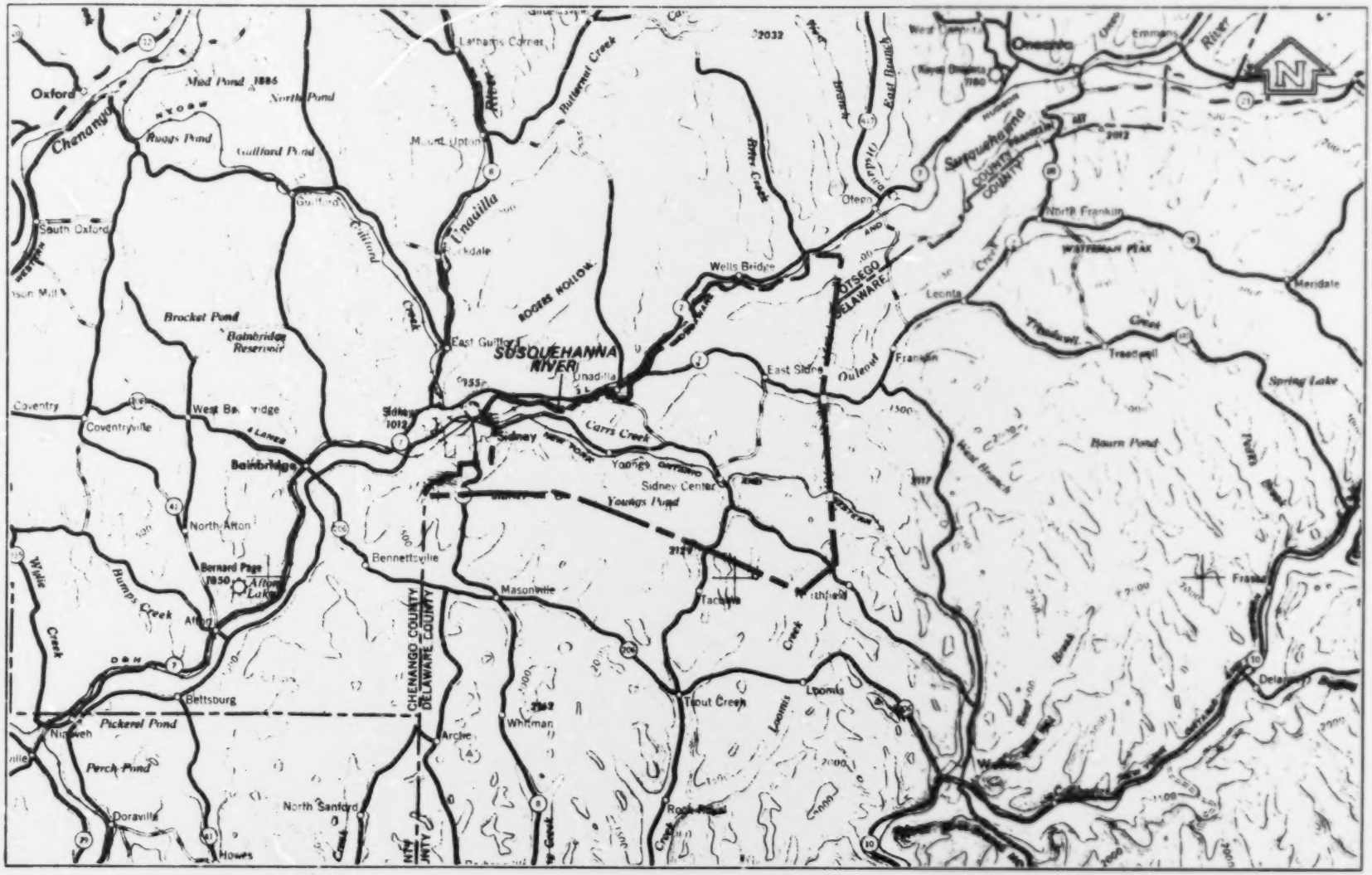

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SIDNEY, NY
(DELAWARE CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

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2.3 Principal Flood Problems

Flooding can occur within the community during all seasons, but the most notable floods have occurred between the months of February and April when snowmelt adds to heavy spring rains to produce increased runoff. Summer and fall floods also occur due to hurricane activity (Reference 3).

The most recent major flood occurred on March 14, 1977, when a USGS stream flow gage on the Susquehanna River measured a peak flow of 23,500 cubic feet per second (cfs) within the Town of Sidney. This event was estimated to be a 25-year event. USGS Gage No. 01500000, located at the East Sidney Lake Dam, and USGS Gage No. 01500500, located in the Village of Unadilla, were used for the hydrologic analysis in this study.

2.4 Flood Protection Measures

The East Sidney Lake Dam is a concrete and rock-fill dike constructed in 1950 by the COE on Ouleout Creek and forms East Sidney Lake, which is used for flood control and recreation. It is located approximately 680 feet upstream of the County Route 44 bridge. The area covered by East Sidney Lake extends to the confluence of Handsome Brook. Discharge through the dam is controlled by the operation of five gates that have a combined capacity of 5,600 cfs when all five gates are fully opened. Water is stored during high flows and is released when downstream conditions warrant.

There are no flood protection measures located on the Susquehanna River within the Town of Sidney.

Non-structural measures of flood protection are being utilized to aid in the prevention of future flood damage. These measures are in the form of land use regulations, which control building within areas that have a high risk of flooding.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at

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short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The hydrologic analysis for the Susquehanna River was computed from gage data. The USGS operates stream flow gage No. 01500500, located in the Village of Unadilla. The gage has 47 years of systematic record. A log-Pearson Type III flood frequency analysis was performed to determine peak 10-, 50-, 100-, and 500-year discharges on the Susquehanna River. The gage is centrally located; therefore, computed gage peaks were transposed upstream and downstream using the ratio of the drainage areas raised to the 0.75 power.

The hydrologic analysis of Ouleout Creek was also computed from gage data. The USGS operates stream flow gage No. 01500000, located at the East Sidney Lake Dam. A log-Pearson Type III flood frequency analysis of the gage data was performed to determine peak 10-, 50-, 100-, and 500-year discharges on Ouleout Creek. These peak discharges were then raised to the 0.75 power. Flood flows are regulated by the operation of five gates in the East Sidney Lake Dam. The USGS stream flow gage is located just downstream of the dam, and the effects of regulation are therefore taken into account. Input data for the flood frequency analysis were restricted to the period after the completion of the flood control dam. Recorded flood peaks prior to 1950 were not incorporated into the analysis.

A summary of drainage area-peak discharge relationships for the streams studied by detailed metods is shown in Table 1, "Summary of Discharges."

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

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TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SUSQUEHANNA RIVER					
At downstream corporate limits	1,588	28,700	36,900	40,300	48,000
At confluence of Unadilla River	1,025	20,700	26,600	29,000	34,500
At USGS Gage No. 01500500 in Unadilla, New York	982	20,029	25,726	28,075	33,456
At confluence of Ouleout Creek	867	18,200	23,400	25,600	30,500
At confluence of Sand Hill Creek	849	18,000	23,100	25,200	30,000
At confluence of Brier Creek	845	17,800	22,900	25,000	29,800
OULEOUT CREEK					
At confluence with Susquehanna River	110	2,700	3,820	4,420	6,150
At USGS Gage No. 01500000 (downstream side of East Sidney Lake Dam)	103	2,565	3,635	4,203	5,850
Upstream side of East Sidney Lake Dam	103	5,896	8,271	9,380	12,227

Cross-section data for the backwater analyses were obtained from aerial photographs at a scale of 1:9,600 and were mapped at a scale of 1:4,800 with a contour interval of 4 feet (References 4 and 5). The below-water sections were obtained by field measurement. All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 6). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Susquehanna River were obtained from the

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Flood Insurance Studies for the Village of Sidney and the Town of Unadilla (References 7 and 8). Starting water-surface elevations for Ouleout Creek were determined using normal depth calculations utilizing the slope/area method.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgement and based on field observations of the streams and floodplain areas. The channel "n" values for the Susquehanna River ranged from 0.040 to 0.050, and overbank "n" values ranged from 0.050 to 0.150. Channel "n" values for Ouleout Creek ranged from 0.030 to 0.035, and overbank "n" values ranged from 0.060 to 0.150. An "n" value of 0.015 was used for concrete structures and 0.024 was used for corregated metal pipes. A weighted average "n" value was used for bridges with steel decks, concrete abutments, and earthern bottoms. Non-effective flow areas were disregarded by using extremely high "n" values. The acceptability of all assumed hydraulic factors, cross sections, and hydraulic structure data was checked by calibrating computed flood profiles to known historic flood profiles.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:4,800 with a contour interval of 4 feet (Reference 5).

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For the streams studied by approximate methods, the 100-year flood boundaries were delineated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet and the Flood Hazard Boundary Map for the Town of Sidney (References 9 and 10).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodway is shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of floodway widths for the Susquehanna River extend beyond the corporate limits.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Susquehanna River								
A	2,840	2400/2150	18,205	1.6	991.8	991.8	992.7	0.9
B	9,060	702/575	6,206	4.7	997.1	997.1	998.1	1.0
C	14,110	239/115	3,710	7.8	1,002.4	1,002.4	1,003.4	1.0
D	17,450	562/495	6,047	4.8	1,008.0	1,008.0	1,009.0	1.0
E	18,760	435/95	5,630	5.2	1,009.3	1,009.3	1,010.3	1.0
F	20,910	525/240	5,135	5.6	1,011.4	1,011.4	1,012.2	0.8
G	21,950	190/95	3,410	8.5	1,012.3	1,012.3	1,013.3	1.0
H	28,490	912/827	7,522	3.7	1,018.7	1,018.7	1,019.5	0.8
I	31,510	475/375	5,306	4.8	1,021.4	1,021.4	1,022.2	0.8
J	34,360	1007/307	8,769	2.9	1,024.5	1,024.5	1,025.5	1.0
K	37,880	614/520	5,490	4.7	1,027.7	1,027.7	1,028.5	0.8
L	42,450	304/184	5,122	5.0	1,033.3	1,033.3	1,034.2	0.9
M	45,300	519/89	5,088	5.0	1,035.5	1,035.5	1,036.5	1.0
N	50,000	238/98	3,422	7.4	1,041.7	1,041.7	1,042.6	0.9
O	53,660	253/130	4,755	5.1	1,048.0	1,048.0	1,048.8	0.8
P	55,430	216/86	4,755	5.3	1,048.9	1,048.9	1,049.8	0.9
Q	57,820	180/85	4,304	5.9	1,049.6	1,049.6	1,050.6	1.0
R	59,560	501/386	8,064	3.1	1,050.7	1,050.7	1,051.6	0.9
S	62,240	1050/125	14,082	1.8	1,051.5	1,051.5	1,052.4	0.9
T	63,810	978/380	13,939	1.8	1,051.7	1,051.7	1,052.7	1.0
U	66,360	830/635	11,540	2.2	1,052.1	1,052.1	1,053.1	1.0
V	69,250	425/95	6,969	3.6	1,052.9	1,052.9	1,053.9	1.0

[1]Feet from corporate limits
[2]Width/width within corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SIDNEY, NY
(DELAWARE CO.)

FLOODWAY DATA

SUSQUEHANNA RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Ouleout Creek								
A	1,250	98	571	7.7	1,020.4	1,017.7[2]	1,018.7	1.0
B	3,480	95	546	8.1	1,023.7	1,023.7	1,024.6	0.9
C	6,210	284	1,317	3.4	1,034.6	1,034.6	1,035.4	0.8
D	8,010	94	609	7.3	1,038.1	1,038.1	1,039.1	1.0
E	11,510	250	999	4.4	1,052.1	1,052.1	1,053.1	1.0
F	13,160	104	743	5.9	1,057.3	1,057.3	1,058.0	0.7
G	14,950	130	469	9.4	1,061.8	1,061.8	1,062.6	0.8
H	16,750	84	518	8.5	1,070.9	1,070.9	1,071.7	0.8
I	19,000	82	641	6.9	1,079.7	1,079.7	1,080.6	0.9
J	21,270	112	643	6.9	1,085.3	1,085.3	1,086.1	0.8
K	23,780	91	474	8.9	1,101.5	1,101.5	1,101.5	0.0
L	28,700	394	27,744	0.3	1,198.5	1,198.5	1,198.5	0.0
M	32,350	697	42,158	0.2	1,198.5	1,198.5	1,198.5	0.0

[1]Feet above confluence with Susquehanna River

[2]Elevation computed without consideration of backwater from Susquehanna River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

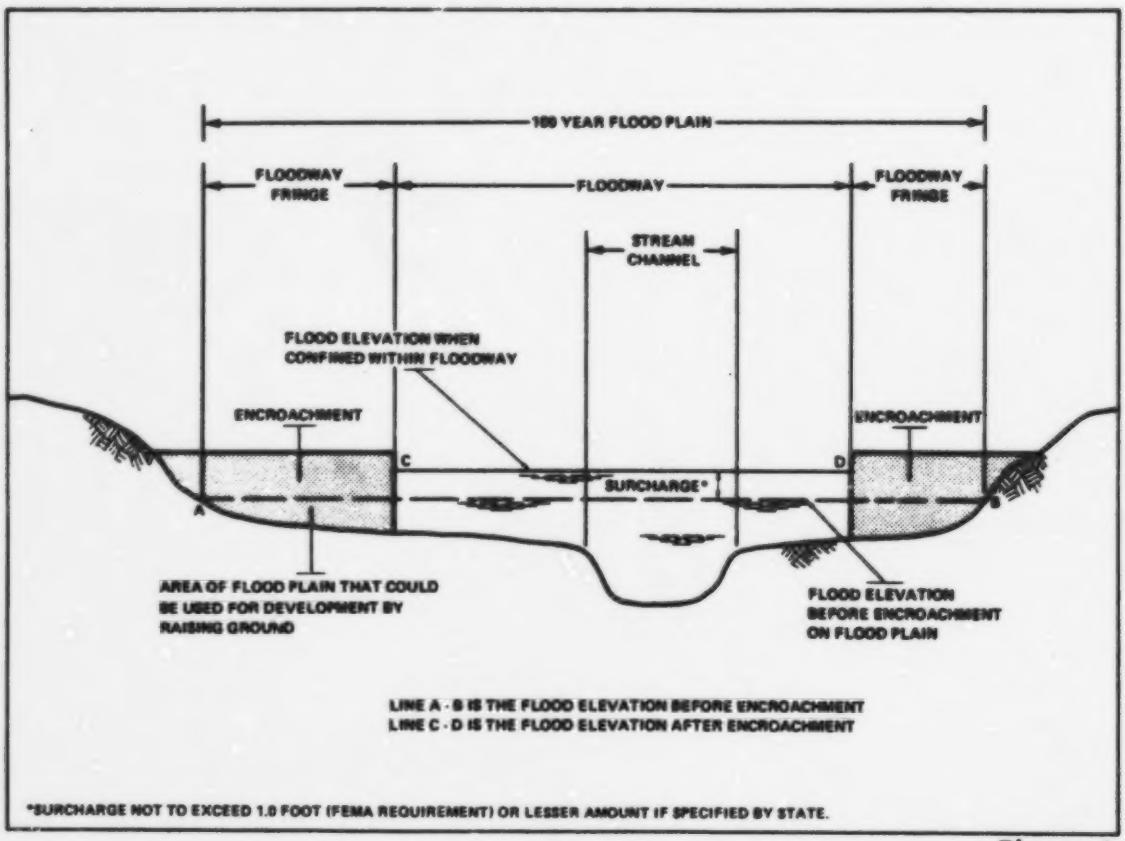
TOWN OF SIDNEY, NY

(DELAWARE CO.)

FLOODWAY DATA

OULEOUT CREEK

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 2

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 2 for certain downstream cross sections of Ouleout Creek are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

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5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

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Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

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7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the Town of Bainbridge (Reference 11). The results of this study agree with the results of that study.

Flood Insurance Studies for the Village of Sidney, the Town of Unadilla, the Village of Unadilla, and the Town of Otego are currently being prepared (References 7, 8, 12, and 13). The results of those studies will be in complete agreement with the results of this study.

Due to the more detailed information, this study supersedes the Flood Hazard Boundary Map for the Town of Sidney (Reference 10).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 26 Federal Plaza, Room 1351, New York, New York 10278.

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9. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Franklin, New York, 1943; Sidney, New York, 1943; Unadilla, New York, 1943.

10. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of Sidney, Delaware County, New York, May 14, 1976.

11. Federal Emergency Management Agency, Flood Insurance Study, Town of Bainbridge, Chenango County, New York, Washington, D. C., December 4, 1984.

12. Federal Emergency Management Agency, Flood Insurance Study, Village of Unadilla, Otsego County, New York (Unpublished).

13. Federal Emergency Management Agency, Flood Insurance Study, Town of Otego, Otsego County, New York (Unpublished).

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EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	02	1,036.58	Chiseled X on top of concrete guardrail post at east end of guardrail on south side of Delaware County Route No. 23, located near southwest corner of intersection of Delaware County Route 23 and Planked Horn Road.
RM 2	06	1,105.51	Box cut at edge of concrete shoulder under west edge of access road crossing on south side of eastbound Interstate Route 88.
RM 3	07	1,075.77	Box cut on northwest corner of eastbound Interstate Route 88 bridge over Crane Hill Road.
RM 4	07	1,021.92	Box cut on top of concrete wing wall of State Route 7 bridge, located at northeast corner of intersection of State Route 7 and State Route 357.
RM 5	11	1,063.64	Railroad spike set one foot up from base of pole No. 193 on west side of County Route 44, 0.9 mile west of County Route 44 bridge (Wells Bridge) over the Susquehanna River.
RM 6	11	1,046.66	USGS disk stamped 1047 Albany 1898 in east corner of north abutment of County Route 44 (Wells Bridge) over the Susquehanna River.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 7	11	1,062.99	Chiseled X on top of northwest corner bolt of guardrail on western end and northern face of westbound bridge of Interstate Route 88.
RM 8	11	1,144.03	D cut on southwest corner of driveway culvert concrete headwall on north side of County Route 44, located 0.5 mile east of Interstate Route 88 overpass.
RM 9	11	1,138.55	Chiseled X on top of third guardrail post west of cattle sign on north side of State Route 357, located approximately 1.5 miles west of East Sidney Lake Dam near culvert that goes under State Route 357.
RM 10	11	1,137.47	Chiseled X on top of last steel guardrail post on west end of guardrail on south side State Route 357, located approximately 1.1 miles west of East Sidney Lake Dam.
RM 11	11	1,219.71	Railroad spike flush with pavement on south side of County Route No. 44, located approximately 0.5 mile east of intersection of County Route 44 and Patent Line Road.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 12	12	1,179.62	PK nail at north edge of pavement on Wells bridge-Otego Road, located 0.85 mile west of Interstate Route 88 overpass of Wells bridge-Otego Road and 25 feet west of 15-inch CMP culvert.
RM 13	13	1,115.34	Top of third concrete guardrail post on west side of County Route 44, approximately 380 feet south of intersection of Gibson Hill Road and County Route 44.
RM 14	13	1,225.21	USGS gaging station reference marker on East Sidney Lake Dam. Marker is one foot west of centerline of dam and approximately 25 feet south of south end of spillway.
RM 15	13	1,255.21	Chiseled X on top of fourth steel guardrail post from east end on north side of State Route 357, located 0.9 mile east of East Sidney Lake Dam.

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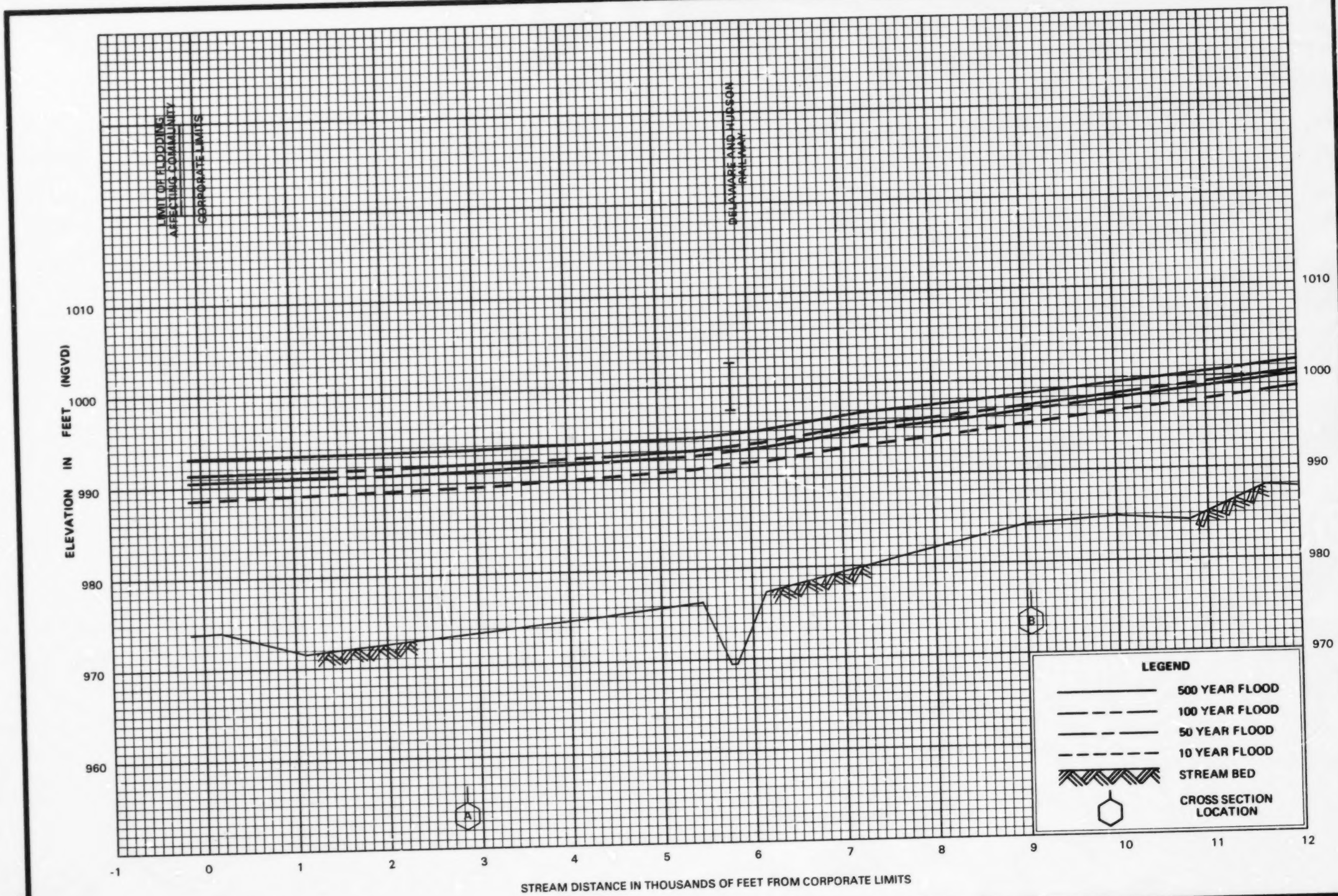

FLOOD PROFILES

SUSQUEHANNA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF SIDNEY, NY
(DELAWARE CO.)

01P

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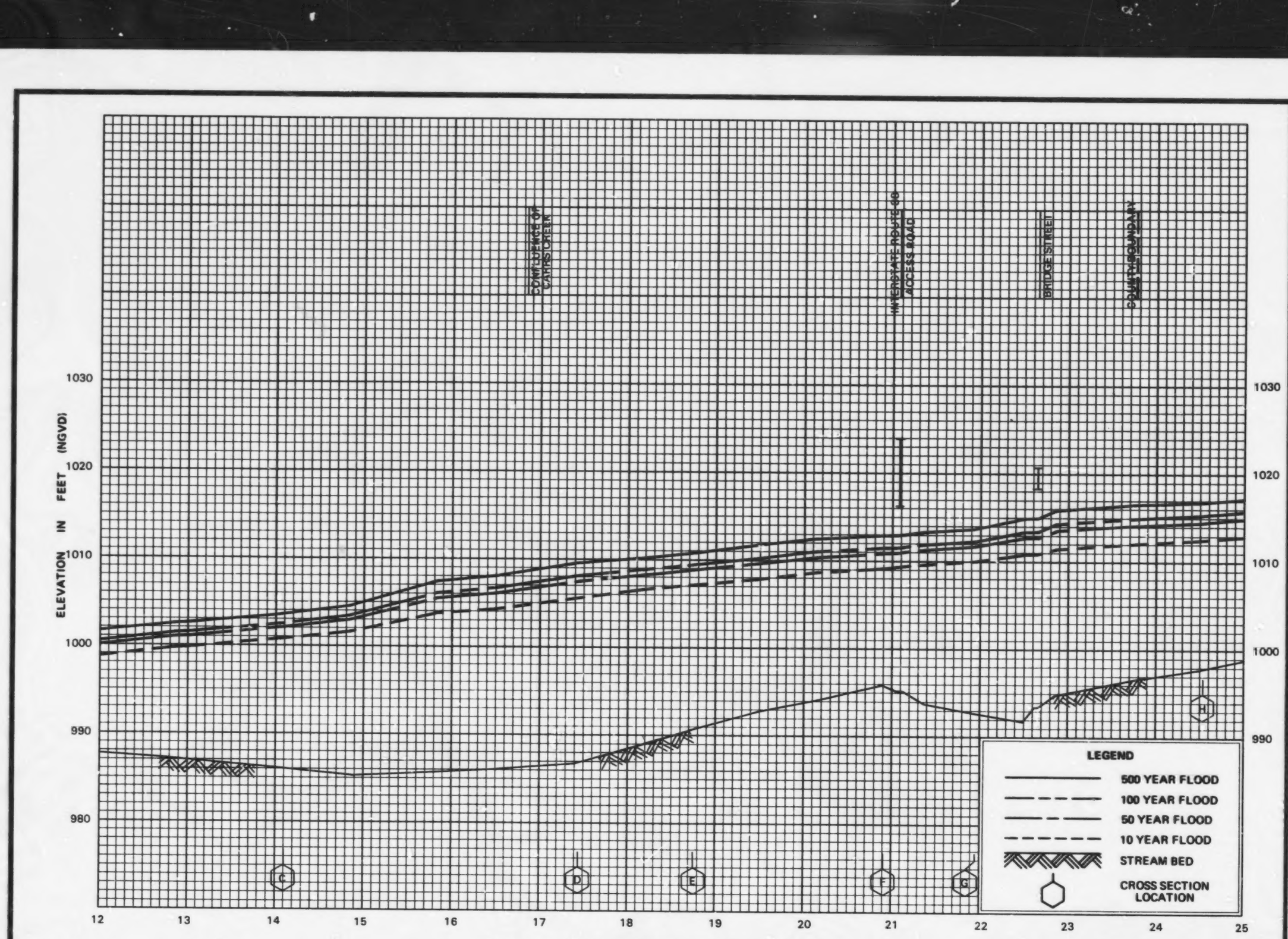

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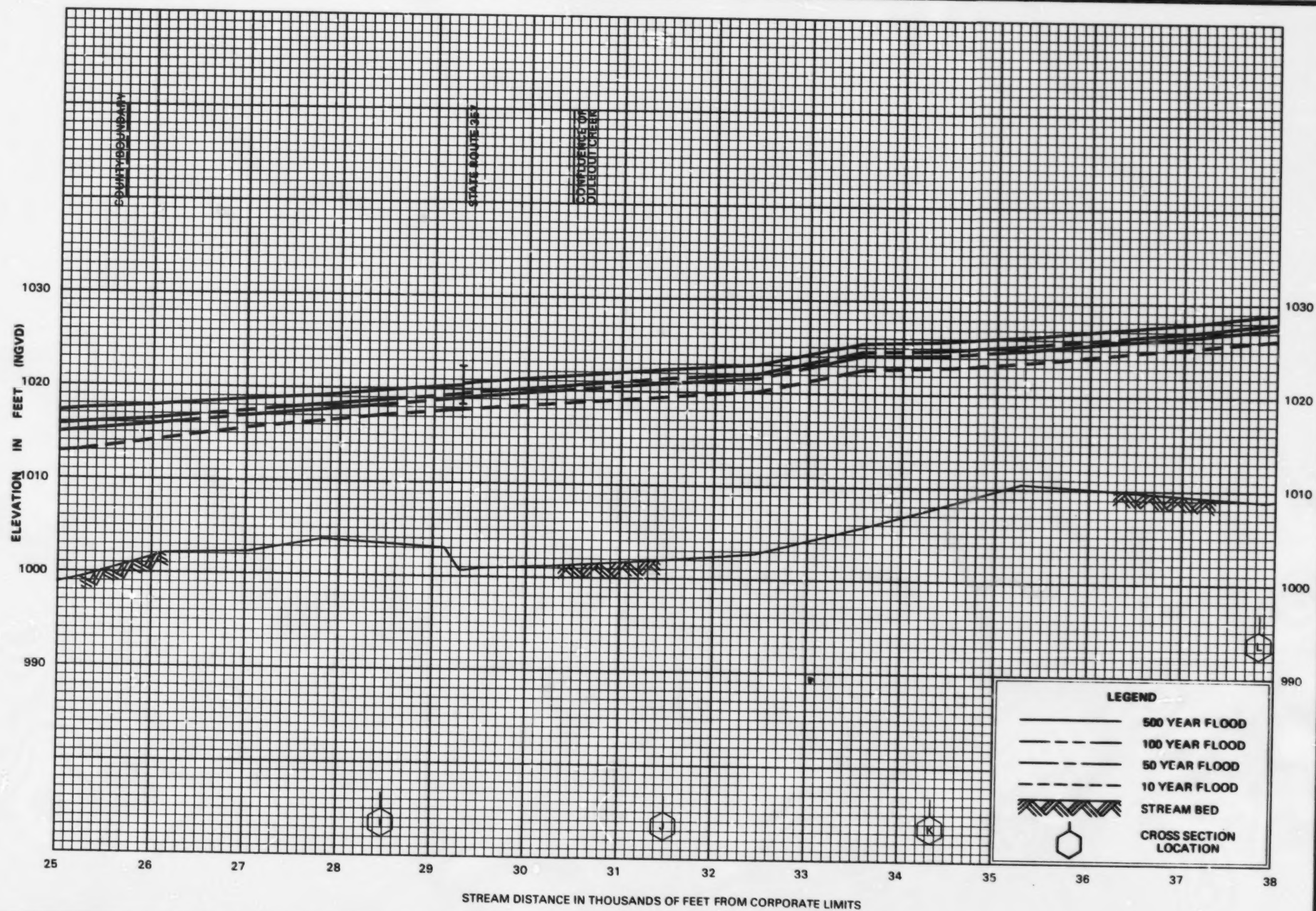

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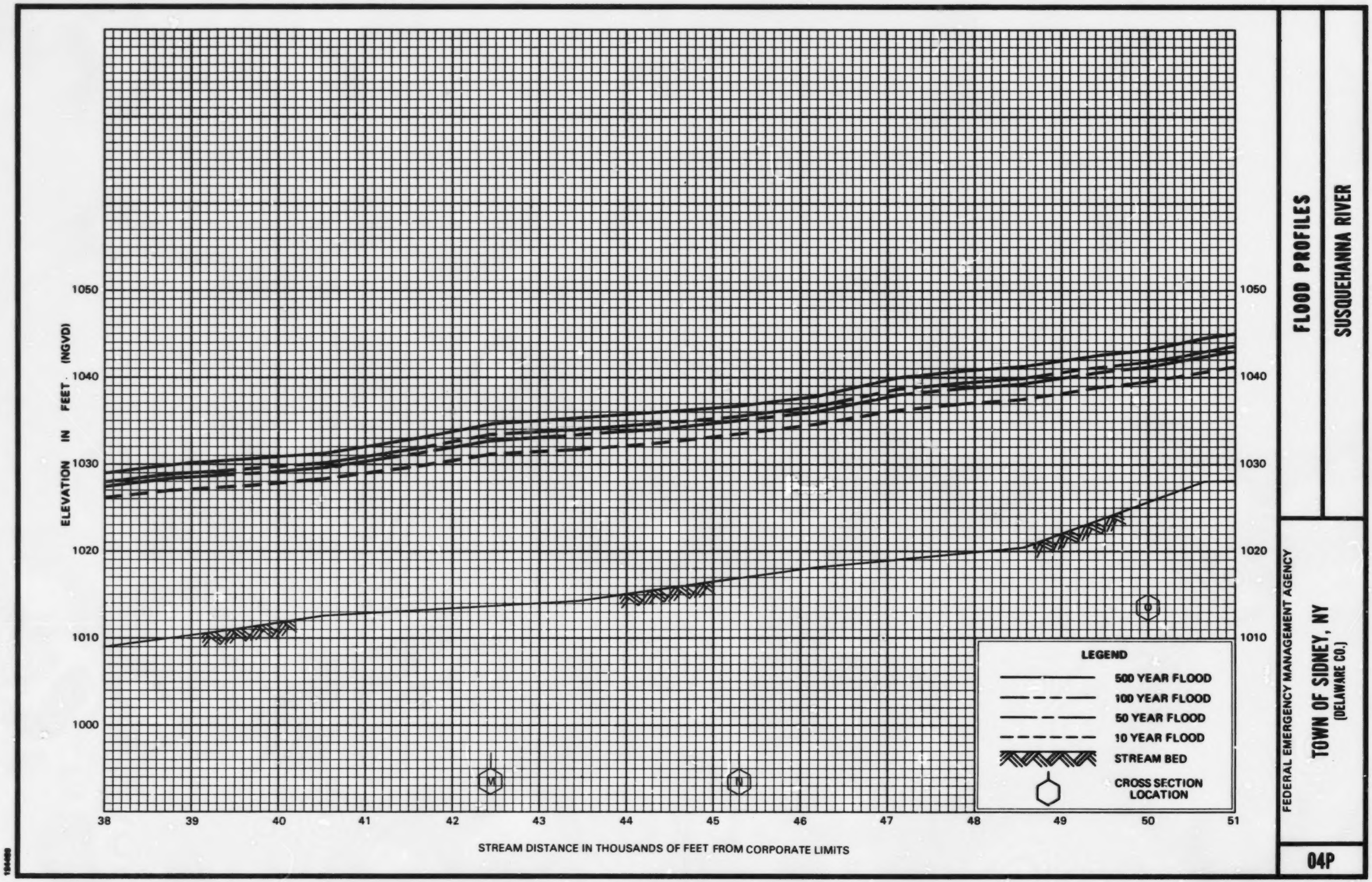

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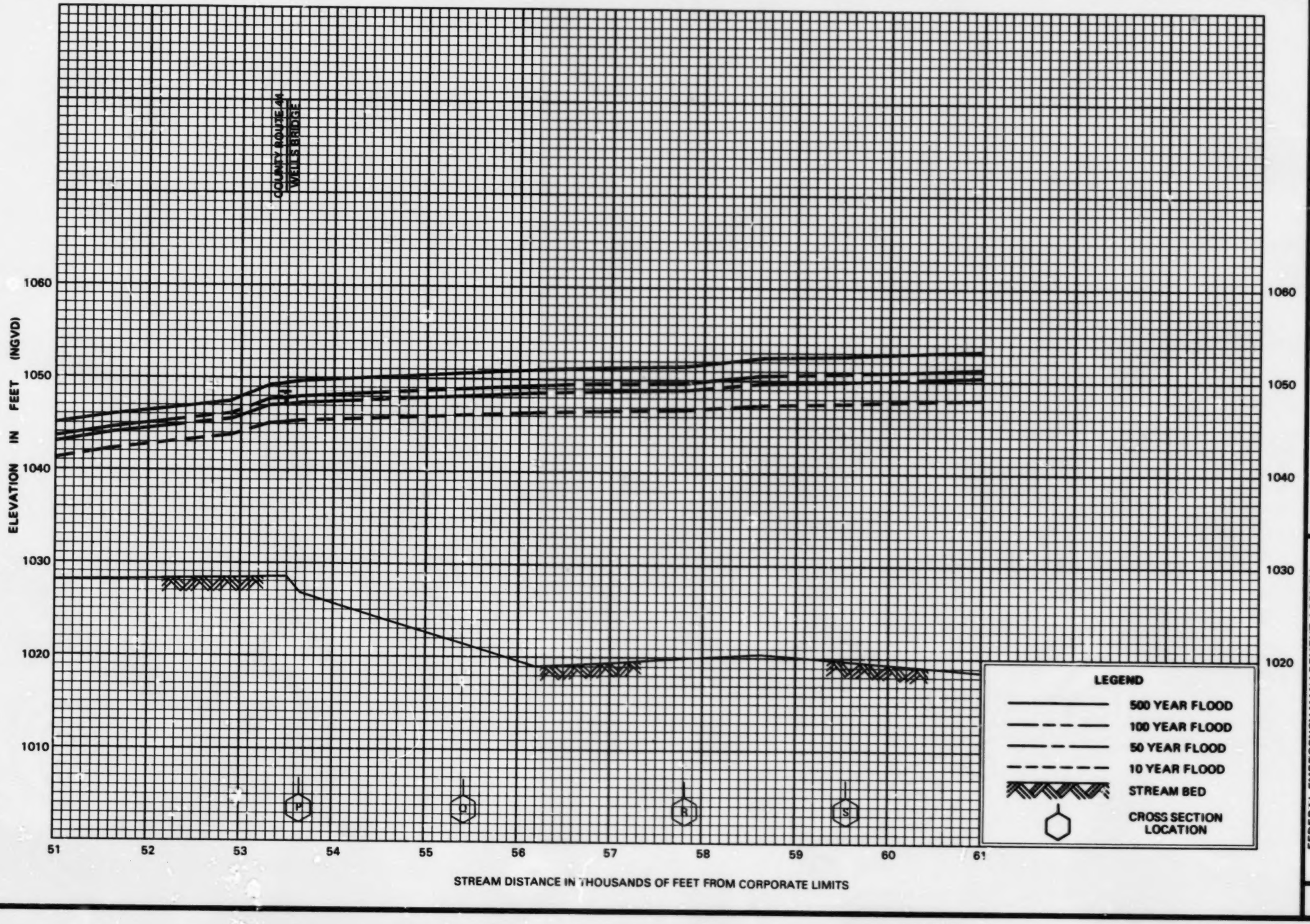

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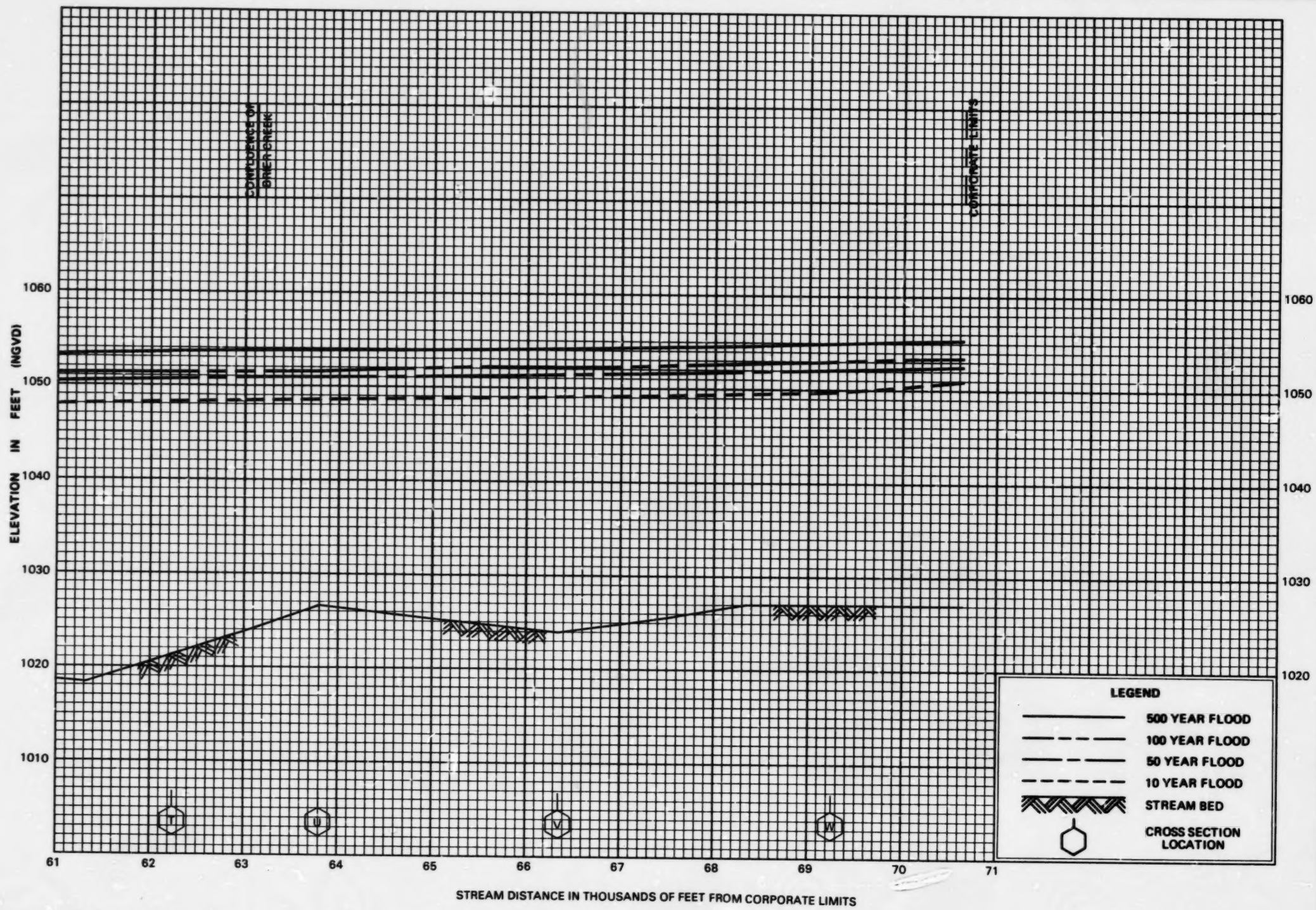

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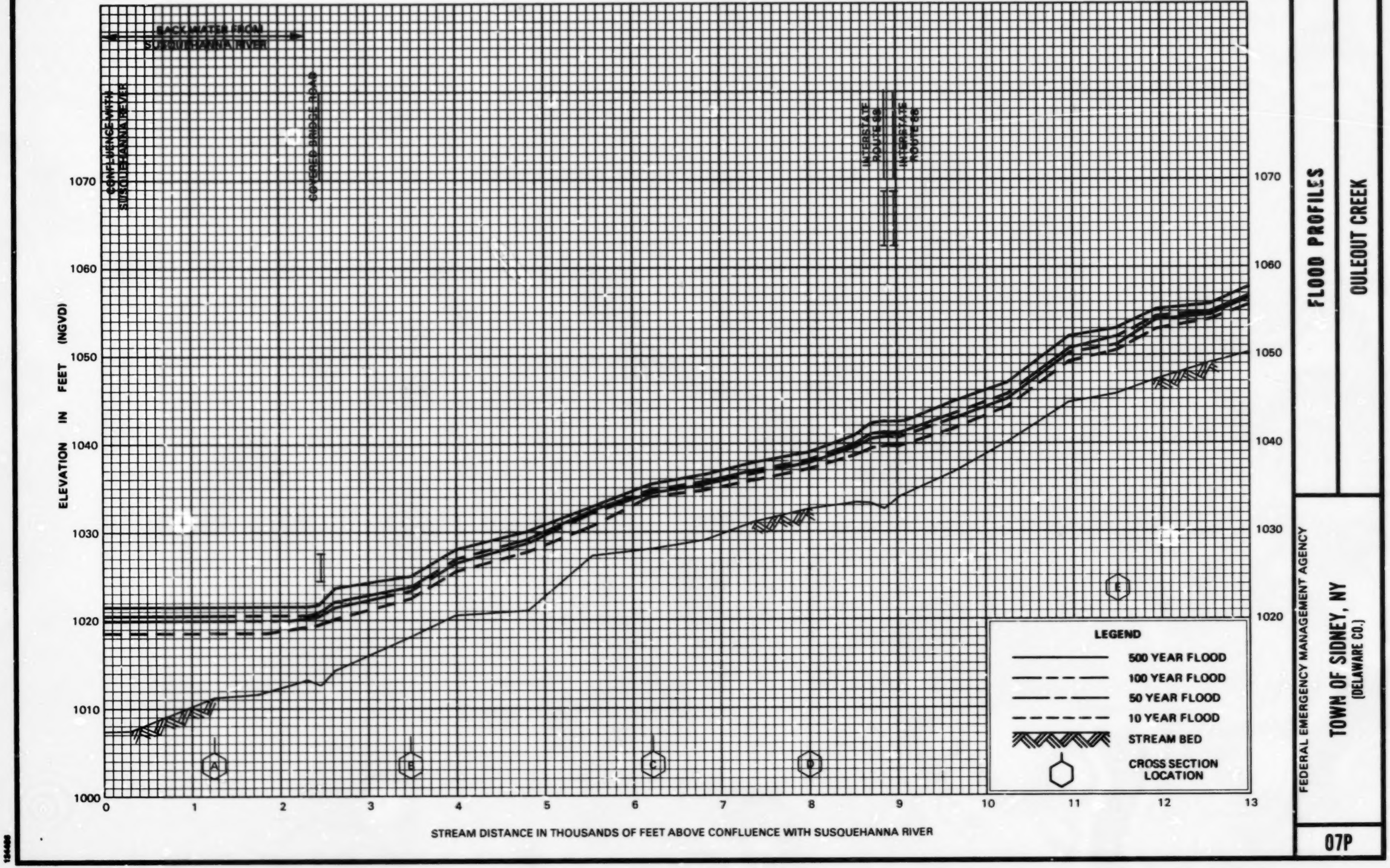

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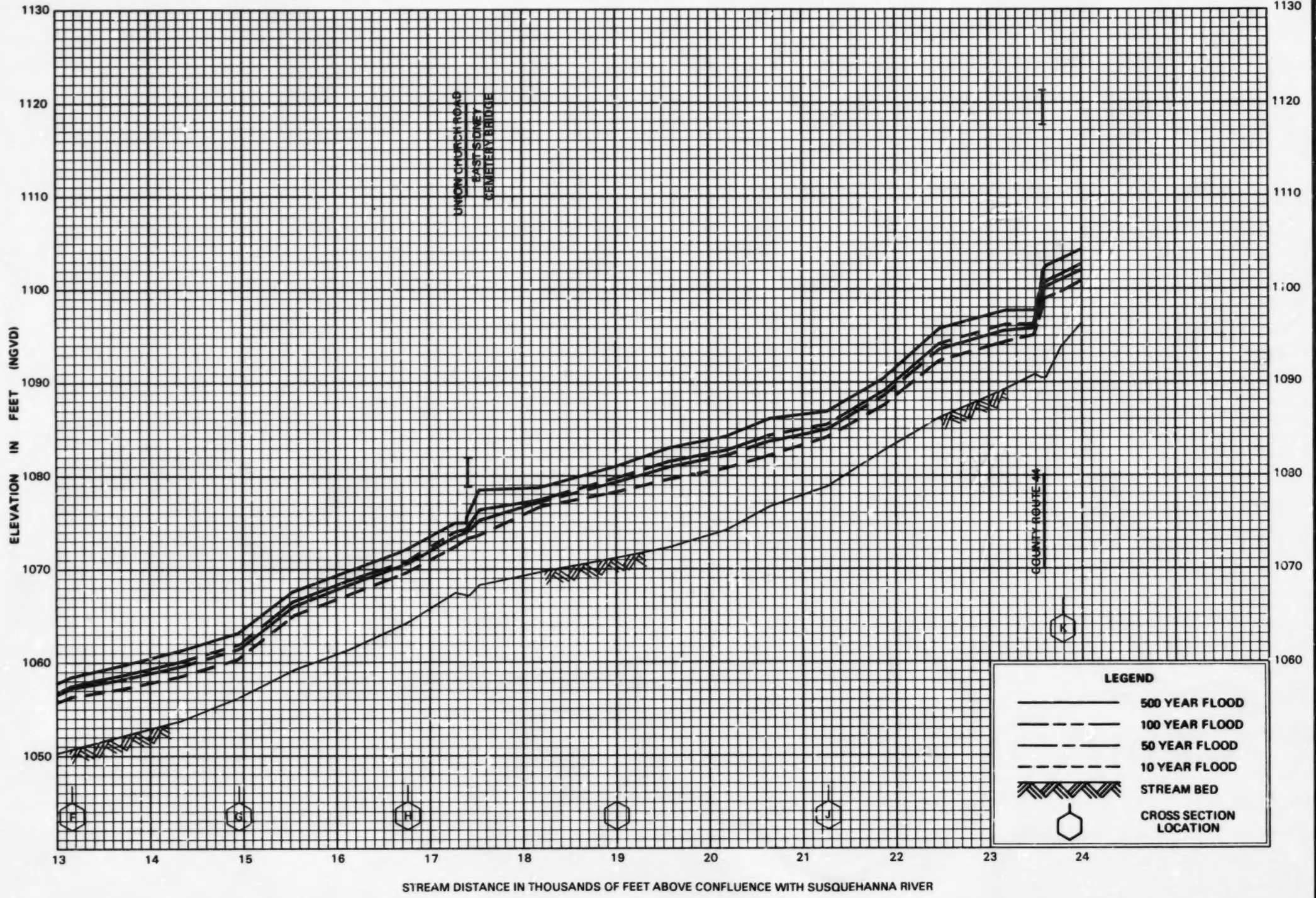

FLOOD PROFILES

OULEOUT CREEK

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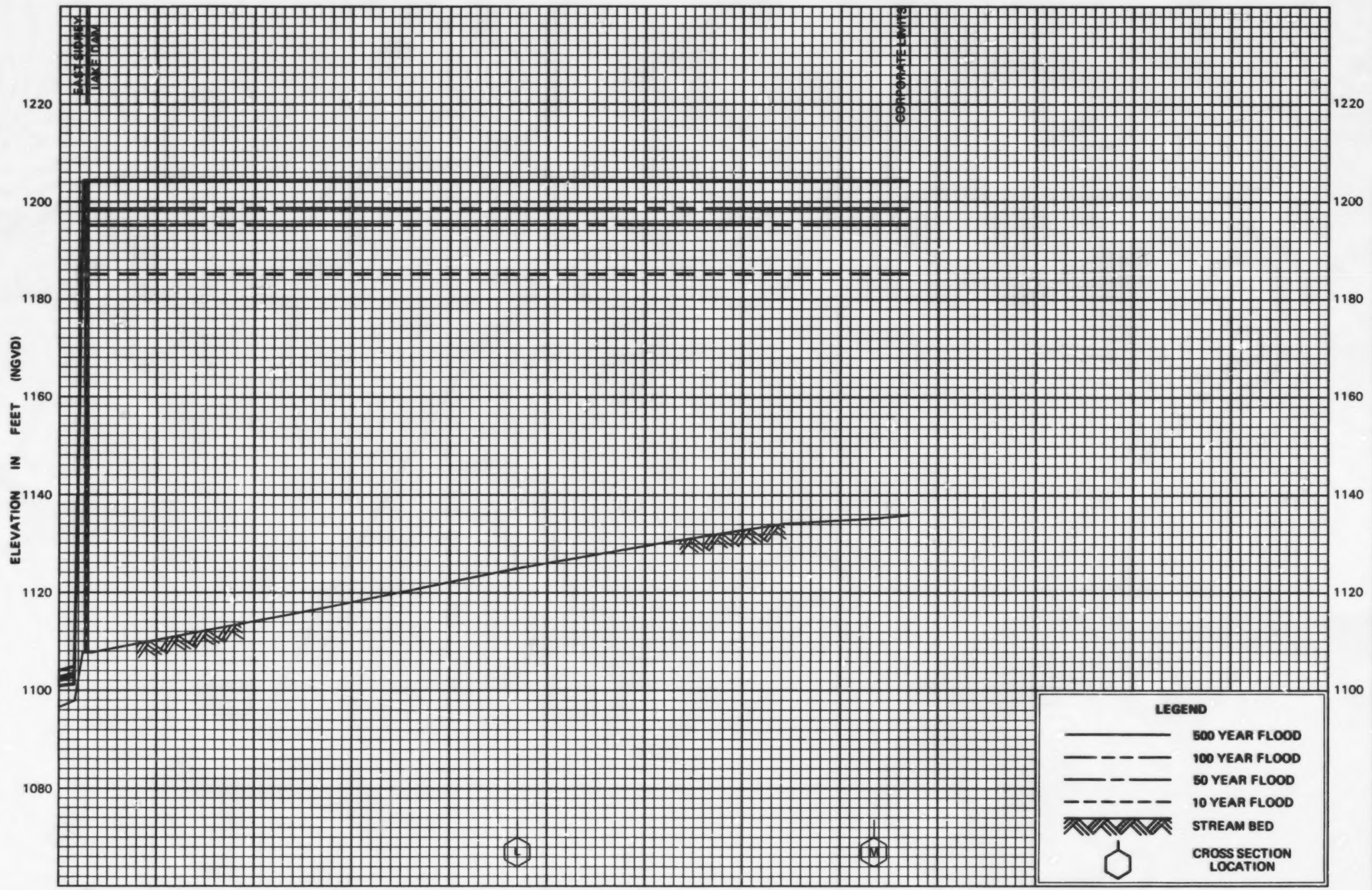

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OULEOUT CREEK

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